DOCUMENT RESUME

ED 177 127 SP 014 723

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TITLE Effect of Teacher Clarity on Student Achievement.
PUB DATE Feb 79
NOTE 11p.; Paper presented at Annual Meeting of the Southwest Educational Research Association (1st, Houston, Texas, February 1979)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Achievement; *Communication Skills; *Effective Teaching; Individual Characteristics; Teacher Behavior; Teacher Characteristics; Teacher Education; Teaching Skills; *Verbal Ability
IDENTIFIERS Teacher Clarity

ABSTRACT

The results of the experimental effect of low-inference teacher clarity variables on achievement and on retention were determined by means of a randomized control group, posttest only, basic design. Members of an introductory education class viewed videotapes of lessons containing either high or low teacher clarity variables. Subjects who took a 30-item criterion test immediately after the viewing were compared to subjects who took a "delayed achievement" criterion test one week after viewing the tapes. Significant differences resulted for the main clarity effect and for the main effect of time-of-achievement. The interaction effect between clarity and time-of-achievement was not significant, i.e., there was no significant differential effect of level of teacher clarity on student retention. (Author/LH)

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Effect of Teacher Clarity on Student Achievement

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SP014723

Paper presented at the first annual meeting of the Southwest Educational Research Association, Houston, Texas, February, 1979

Abstract

The results of the experimental effect of a cluster of low-inference teacher clarity variables on achievement and on retention were determined by means of a randomized control group, posttest only, basic design. The low-inference variables were controlled by means of a videotape technique. Significant differences resulted for the clarity main effect, F (1,74) = 7.456, $p < .01$, and for the main effect of time-of-achievement, F (1,74) = 5.398, $p < .05$. The interaction effect between clarity and time-of-achievement was not significant, that is, there was no significant differential effect of level of teacher clarity on student retention. The findings are discussed and suggestions are made for additional research.

Teacher clarity research can best be characterized as descriptive (as opposed to experimental) and dealing with abstract or high-inference variables (as contrasted with concrete or low-inference variables). This lack of intensive study of the cause-effect relationship between low-inference teacher variables and student achievement has contributed to inconsistencies in findings. Wright and Nuthall (1970) stated, "The greatest service [which can be done] . . . is to point up behavioral variables which have functional significance in the classroom." This article describes an experimental study of the effects of a cluster of low-inference teacher clarity variables on student learning, and the interaction between these variables and retention. The clarity variables for this study were teacher vagueness; mazes; utterances of "uh;" specification or emphasis of selected content; extra, but related content; and signals of transition. Gage (1978) suggested this cluster-of-variables approach.

Previous Research

Vagueness terms

Hiller, Fisher, and Kaess (1969) and Smith (1977) reported significant negative correlations between teacher vagueness terms and student achievement. Vagueness terms are words or phrases indicating approximation, unclarity, or lack of assurance. In experimental studies, Smith and Edmonds (1978) and Land and Smith (1979), reported significant differences between students learning under vagueness conditions (7.5 per minute) and students learning with no vagueness conditions.

Mazes, "uh"

Smith (1977) reported a nonsignificant negative correlation between the frequency of teacher mazes and student learning. He described mazes as false starts or halts in speech, redundantly stated words, and tangles of words. Land and Smith (1979) reported a significant difference between students learning under the influence of teacher mazes (5.1 per minute) and students learning under a "no mazes" condition. Another low-inference variable related to mazes is the use

of "uh," "ah," or "um." Hiller and his associates identified this item as one variable in a cluster they labeled as verbal fluency. They reported a significant, positive correlation between teacher verbal fluency and student achievement. Smith (1977) reported nonsignificant negative correlations between the occurrence of teacher "uh's" and achievement. Bush, Kennedy, and Cruickshank (1977) identified what appears to be a comparable behavior in "speaks grammatically."

Specification and emphasis

Penny (1969) and Crossman and Olson (1969) counted the number of times that words to be learned were emphasized by teachers; Penny reported significant differences. Kennedy, Cruickshank, Bush, and Myers (1978) reported behavioral statements that may be comparable to this variable. These items are "gives explanations we understand" (item 1), "teaches step-by-step" (item 4), "describes the work to be done and how to do it" (item 5), "gives specific details" (item 8), "works examples and explains them" (item 10), and "stresses difficult points" (item 25).

Transitions

Crossman and Olson (1969) reported a low-inference study in which they counted the times that teachers gave a clear indication of a transition between the ending of one part of a lesson and the beginning of another part. They did not report tests of significance. Kennedy et al. (1978) reported what may be a comparable behavior in the statement "prepares us for what we will be doing next" (item 7).

Extra content

Land and Smith (1979) reported no significant differences that could be attributed to additional related-but-unexplained terminology. The additional terms in their study, however, were used only superficially. Kennedy et al. (1978) identified what may be a comparable behavior in "explains things simply" (item 18).

If teacher clarity affects immediate student achievement, is there also an effect on student retention? Do students learning under low-clarity conditions

forget content at the same rate, at a lesser rate, or at a greater rate? The purpose of this experimental study, then, was to determine the effect of a cluster of low-inference teacher clarity variables--teacher vagueness terms, mazes, "uh's," specification of selected content, extra content, and signals of transition--on student achievement and the effect of teacher clarity on student retention.

Method

The investigator used a 2 (high clarity versus low clarity) x 2 (immediate versus delayed achievement) experimental design. The lessons were videotaped to gain the advantage of a tightly controlled design. The only difference in the lessons was the presence or absence of the selected teacher clarity variables. The same basic content--five related concepts on the composition of subject matter--was explained in the same order with exactly the same examples. Following are examples of the type and quantity of each teacher clarity variable in the study.

High clarity (clear teaching)	Low clarity (unclear teaching)
a. No teacher vagueness terms. Example: "A generalization is a complete statement that expresses one or more relationships between two or more concepts, and applies to a variety (more than one) of instances."	a. 3.76 vagueness terms per minute. Example with terms italicized. "A generalization may be a complete statement that seems to express several relationships between two or more concepts, and applies to a variety (more than one) of instances."
b. No teacher mazes. Example: "A generalization is a complete statement that expresses one or more relationships . . . "	b. 3.80 mazes per minute. Example with terms italicized. "A generalization is a complex, complete statement that states, expresses one or more relationships . . . "
c. No teacher "uh's."	c. 3.80 "uh's" per minute.
d. No additional, unexplained content.	d. Additional content. 1. defined specifically in context: 0.3 per minute. 2. not defined: 0.2 per minute.

e. Specification of why an item is an example of a definition; 1.0 per minute. Example: "Here are three examples of generalizations. The first example is 'Mammals are warm-blooded vertebrates'. It is an example of a generalization because it meets all three parts of the definition in that it is a complete statement . . . "

e. No specification; some examples in the same order of the high clarity lesson. Example: "Here are three examples of generalizations. The first example is 'Mammals are warm-blooded vertebrates'."

f. Clear transition; 0.3 per minute. Example: "The next item we are going to study is called a generalization. A generalization . . . "

f. Transition not clear. Example: "A generalization . . . "

The rationale for the behaviors selected is presented in Figure 1.

Figure 1

Low Inference Clarity Variables

Low inference behaviors	Frequency	Rationale
vagueness	3.76 per minute	Hiller et al. (1969) reported an average of 3+ terms per minute occurring among the teachers they studied in a standard classroom environment. The figure of 3.76 was arrived at on the basis of descriptive research by Smith (1977).
mazes	3.80 per minute	Based on descriptive research (Smith, 1977); this figure represents one standard deviation above the mean of the occurrences of mazes in teacher talk in a public school environment.
uh	3.80 per minute	Based on descriptive research (Smith, 1977); this figure is one standard deviation above the mean of the occurrence of "uh's" in teacher talk in a public school environment.
specification	1.00 per minute	The lesson was planned; then, the occurrence of this behavior was counted and reported.

Figure 1 (Continued)

signals of transition	0.3 per minute	(Same rationale as on specification.)
extra content	0.5 per minute	In planning the lesson, the author worked in extra terminology that related to the main concepts. Then, the occurrence was counted and reported.

The subjects, who were enrolled in the introductory education course at a state college in the Midwest, were placed randomly into treatment groups. They viewed the videotapes and the subjects in the "immediate achievement" groups (Table 1) immediately took a 30-item criterion test (Kuder-Richardson reliability of .924) based on the contents of the lesson. The subjects in the "delayed achievement" groups took the test one week after viewing the lesson. The effect of clarity on retention was to be deduced from the presence or absence of an interaction between teacher clarity and time of achievement.

Results

A 2 x 2 analysis of variance was computed on the scores; mean scores are presented in Table 1. Table 2 shows the clarity main effect was significant, F (1,74) = 7.456, $p < .01$. In addition, the time-of-achievement main effect was significant, F (1,74) = 5.398, $p < .05$. The interaction effect, however, was not significant.

TABLE 1

Group Mean Scores

Achievement	Teacher Clarity: High	Teacher Clarity: Low
Immediate	N = 20 $\bar{X}$ = 24.30 SD = 2.51	N = 18 $\bar{X}$ = 21.06 SD = 4.99
Delayed	N = 20 $\bar{X}$ = 21.50 SD = 4.86	N = 20 $\bar{X}$ = 19.05 SD = 5.02

TABLE 2

Results of Analysis

Source	df	MS	F
Clarity (A)	1	156.678	7.456**
Time of achievement (B)	1	113.435	5.398*
A x B	1	3.070	<1.000
Error	74	21.015	

*$p < .05$

**$p < .01$

Discussion

This study is among the very first presenting evidence for a cause-effect relationship between a cluster of low-inference teacher clarity variables and student achievement. It is the first known report of the effect of teacher clarity on student retention. The evidence presented indicates no differential effect of teacher clarity on student retention based on the finding of no significant interaction between teacher clarity and time of achievement. On the basis of the rate of forgetting implied by the data in Table 1, and assuming a consistent rate of forgetting (an assumption with pitfalls), one might anticipate a differential effect of clarity on retention after four or five weeks, during which the initial effects of low teacher clarity have disappeared. This hypothesis needs to be tested.

Additional research is needed to refute or confirm the findings in this study. If the results are confirmed that this cluster of clarity variables does consistently affect achievement, then the next research step is to study the effect of each of the low inference variables involved to isolate and quantify the effects of these variables, individually and in various combinations. Then, an experimental design to study the effects of these variables in classrooms over a longer period of time is needed.

What are the possible implications for teacher education? The experimental research base for teacher education is almost nonexistent. Too often, we train pre-service and in-service teachers, on a gut feeling basis because of this relative lack of research. Ideally, we should give top priority and increasing priority to those items that show the most consistent positive affect on achievement. Perhaps the single most relevant suggestion for teacher education is that teacher educators focus more attention on manageable behaviors or items that can be observed, quantified, and objectively critiqued by observers. Specifically, in the area of teacher clarity, this process would involve assisting pre-service and in-service teachers in reducing their clarity inhibitive behaviors and in increasing those behaviors that enhance teacher clarity, as identified by research.

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